

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Applicants: Jill MacDonald Boyce

Examiner: Jessica M. Roberts

Serial No: 10/561,361

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Docket: PU030180 (156-762)

For: MULTIPASS VIDEO RATE CONTROL TO MATCH SLIDING WINDOW CHANNEL
CONSTRAINTS

Mail Stop Appeal Brief-Patents
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REPLY BRIEF

Applicants provide this Reply Brief to the Examiner's Answer dated May 11, 2010.

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1. Status of Claims

Claims 1 and 3-22 are pending. Claims 1 and 3-22 stand rejected and are under appeal. Claim 2 has been cancelled without prejudice.

2. Grounds of Rejection to be Reviewed on Appeal

Claims 1 and 3-22 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,118,817 to Wang et al. (hereinafter "Wang") in view of U.S. Patent No. 5,978,029 to Boice et al. (hereinafter "Boice") in further view of U.S. Patent No. 7,016,337 to Wu et al. (hereinafter "Wu").

The preceding rejection under 35 U.S.C. §103(a) is presented for review in this Appeal with respect to Claims 1, 3-22, as argued with respect to independent Claims 1, 13, and 14.

Regarding the grouping of the claims, Claims 3-12 stand or fall with Claim 1, and Claims 15-22 stand or fall with Claim 14, due to their respective dependencies. Claim 13 stands or falls by itself.

3. Argument

A. Introduction

Video data is generally processed by a video encoder and transferred in the form of bit streams. Variable bit rate ("VBR") video encoders can achieve better quality video compression than constant bit rate ("CBR") video encoders for the same average bit rate as measured over a time interval, such as, for example, over an entire program length. Better quality video compression is achieved with VBR encoding because as the complexity of the video changes

throughout the video sequence, variable bit rate encoded video is created to maintain a constant quality. On the other hand, with CBR encoded video data, the encoded bit rate is kept constant causing the perceived video quality to vary. As a result, the worst case video quality for CBR is generally not as good as the constant quality level for VBR. Since user perception is greatly influenced by the worst case quality, VBR video is generally preferred over CBR video.

Unfortunately, communications networks typically have fixed bandwidth links that are more amenable to CBR video than to VBR video. Consequently, CBR video encoding is typically used to meet the bandwidth requirements of a network traffic model, while VBR video encoding is typically used for applications that do not use fixed bandwidth channels (e.g. DVDs). However, there is a need a for a VBR video scheme which can be used in communication networks, and other situations where a fixed bandwidth is imposed.

Advantageously, the present invention provides “[a]n encoder for encoding a sequence of pictures as a plurality of block transform coefficients to meet network traffic model restrictions” (Claim 1), “[a] computer program product comprising a computer useable medium having computer readable program code embodied thereon for use in a video encoder” (Claim 13), and “[a] method of performing video rate control on a sequence of pictures to meet network traffic model restrictions” (Claim 14) which provide a number of advantages over the prior art and dispense with the problems that plague prior art systems.

In addition, the claims of the pending invention include novel features not shown in the cited references and that have already been pointed out to the Examiner. Thus, it is respectfully asserted that independent Claims 1, 13 and 14 are each patentably distinct and non-obvious over the cited references in their own right. For example, the below-identified elements of

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independent Claims 1, 13 and 14 are not shown in the cited reference, taken either singly or in any combination. Moreover, these claims are distinct from each other in that they are directed to different implementations and/or include different elements. For example, Claim 1 is directed to an encoder, Claim 13 is directed to a computer program product, and Claim 14 is directed to a method of performing video rate control a sequence of pictures to meet network traffic model restrictions. Moreover, the encoder in Claim 1, the computer program product in Claim 13, and the method in Claim 14, each include different elements from each other and they need to be considered separately. Accordingly, each of independent Claims 1, 13 and 14 represent separate features/implementations of the invention that are separately novel and non-obvious with respect to the prior art and to the other claims. As such, independent Claims 1, 13 and 14 are separately patentable and are each presented for review in this appeal.

B. Whether Claims 1 and 3-22 are Rendered Obvious under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,118,817 to Wang et al. in view of U.S. Patent No. 5,978,029 to Boice et al. in further view of U.S. Patent No. 7,016,337 to Wu et al.

The failure of an asserted combination to teach or suggest each and every feature of a claim remains fatal to an obviousness rejection under 35 U.S.C. § 103. Section 2143.03 of the MPEP requires the "consideration" of every claim feature in an obviousness determination. To render a claim unpatentable, however, the Office must do more than merely "consider" each and every feature for this claim. Instead, the asserted combination of the patents must also teach or suggest *each and every claim feature*. See *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974) (emphasis added) (to establish *prima facie* obviousness of a claimed invention, all the

claim features must be taught or suggested by the prior art). Indeed, as the Board of Patent Appeal and Interferences has recently confirmed, a proper obviousness determination requires that an Examiner make "a searching comparison of the claimed invention - *including all its limitations* - with the teaching of the prior art." *See In re Wada and Murphy*, Appeal 2007-3733, *citing In re Ochiai*, 71 F.3d 1565, 1572 (Fed. Cir. 1995) (emphasis in original). "If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious" (MPEP §2143.03, *citing In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)).

The Examiner rejected Claims 1 and 3-22 as being obvious under 35 U.S.C. § 103(a) with respect to U.S. Patent No. 6,118,817 to Wang et al. (hereinafter "Wang") in view of U.S. Patent No. 5,978,029 to Boice et al. (hereinafter "Boice") in further view of U.S. Patent No. 7,016,337 to Wu et al. (hereinafter "Wu"). The Examiner contends that the cited combination discloses all of the elements recited in Claims 1 and 3-22.

Wang relates to an encoder that uses two loops to encode a video signal. A primary open loop rate control attempts to select an quantization parameter by comparing the size of single encoded frame to a target encoded frame size (Wang: col. 4, lines 15-19; col. 9, lines 7-11). If the encoded frame size is greater or less than the target encoded frame, the quantization parameter is adjusted in order to increase or decrease the size of subsequently encoded frames (Wang: col. 4, lines 19-26). However, since the adjustment of the quantization parameter may cause the available bandwidth to be exceeded, a secondary closed loop rate control monitors a cumulative bandwidth balance to ensure that overall available bandwidth is never exceeded (Wang: col. 4, lines 30-32; col. 9, lines 11-28).

Boice relates to an encoding system with two encoders for use in real-time systems (Boice: Title; col. 2, lines 53-56; col. 7, lines 47-48). Boice teaches that a first encoder is employed to analyze a sequence of video frames and derive statistical information regarding the video frames (Boice: col. 2, lines 56-61; col. 8, lines 13-17). The first encoder is coupled to a control processor which processes the statistical information to produce a value for a parameter used to encode the sequence of video frames (Boice: col. 2, lines 61-65; col. 12, lines 31-35). The control processor sends the value associated with an encoding parameter to a second encoder which is also coupled to the processor (Boice: col. 2, lines 65-67; col. 12, lines 31-35). The second encoder then uses the value to encode each frame of the sequence of video frames, thereby producing a bit stream of encoded data (Boice: col. 3, lines 1-4; col. 12, lines 35-38).

Wu relates to a system and method for multiplexing a plurality of channels for transmission over a single medium (Wu: col. 5, lines 11-14). The system includes a plurality of encoders, a statistical multiplexer and a transport medium (Wu: col. 5, lines 63-66). The statistical multiplexer includes a scheduler and a multiplexer which receives streams and combines them into a single stream that matches the bandwidth of the physical transport medium (Wu: col. 6, lines 9-16).

It will be shown herein below that the limitations of Claims 1, 13 and 14 reproduced herein are not shown in the cited combination of Wang, Boice and Wu, and that Claims 1, 13 and 14 should be allowed, including the claims dependent there from as identified in Section 6 herein.

B1. Claims 1 and 3-22

It should be noted that Claims 3-12 directly or indirectly depend from independent Claim 1, and Claims 15-22 directly or indirectly depend from independent Claim 14. Thus, Claims 3-12 include all the elements of Claim 1, and Claims 15-22 include all the elements of Claim 14. No claims are dependent upon independent Claim 13.

It is respectfully asserted that none of the cited references, either taken singly or in combination, at least fail to teach or suggest the following elements of claim 1:

pre-encoding means for pre-encoding the sequence of pictures for each of a plurality of quantization parameter values;
selecting means for selecting for each picture of the sequence one of the plurality of quantization parameter values responsive to the quantization parameter values and bitrate operating points of the neighboring pictures in a predetermined time window

It is respectfully asserted that none of the cited references, either taken singly or in combination, at least fail to teach or suggest the following elements of claim 13:

program code for pre-encoding the sequence of pictures for each of a plurality of quantization parameter values;
program code for selecting for each picture of the sequence one of the plurality of quantization parameter values responsive to the quantization parameter values and bitrate operating points of the neighboring pictures in the sliding time window

It is respectfully asserted that none of the cited references, either taken singly or in combination, at least fail to teach or suggest the following elements of claim 14:

pre-encoding the sequence of pictures for each of a plurality of quantization parameter values;

selecting for each picture of the sequence one of the plurality of quantization parameter values responsive to the quantization parameter values and bitrate operating points of the neighboring pictures in a predetermined time window

Initially, prior to reproducing the arguments submitted in the Appeal Brief, Applicants will address the Examiner's comments in the Examiner's Answer.

At the outset, Applicants would like to address the Examiner's argument that the cited references teach or suggest "*pre-encoding the sequence of pictures for each of a plurality of quantization parameter values*" as recited in claims 1, 13 and 14.

In describing the above element recited in claims 1, 13 and 14, Applicants' specification explains the following:

In a pre-encoding step, the video sequence is independently encoded using several different quantization parameter ("QP") values.

(Present Specification: page 7, lines 9-11)

Thus, in a pre-encoding step, the video sequence is encoded independently several different times for a set of different QP values. Motion estimation can either be done in advance with the same motion vectors used in all cases, or motion estimation can be done for each separate encoding. The several encodings can be done either sequentially on the same processor, or in parallel by distributing each separate encoding run to a separate processor. The number of bits used to encode each frame for each QP run is recorded.

(Present Specification: page 9, lines 5-11)

As can be seen, the "pre-encoding" element recited in the present claims essentially involves encoding the same sequence of pictures using different quantization values. However, nothing in the cited references teaches or suggests anything of the sort.

In maintaining the present rejection, the Examiner concedes that Wang fails to disclose the pre-encoding feature recited in the present claims (e.g., see page 6 of the final Office Action dated June 10, 2009), but contends that such is disclosed by Boice. Applicants respectfully disagree with the Examiner's interpretation of Boice.

Boice teaches an encoding scheme which employs two encoding subsystems. The first encoding subsystem analyzes a sequence of video frames and derives information about the sequence (e.g., scene change or picture type) (Boice: col. 2, lines 42-49). It should be noted that although the first subsystem is referred to as an "encoding" subsystem, the first subsystem merely derives statistical information about a sequence of frames but does not actually encode any of the frames, and certainly does not encode the frames "for each of a plurality of quantization parameter values". Rather, the actual encoding of the frames is performed by the second encoding subsystem (Boice: col. 2, lines 49-52). However, like the first encoding subsystem, the second encoding subsystem does not encode the frames "for each of a plurality of quantization parameter values". In fact, Boice is completely silent with respect to encoding a sequence of frames with more than one quantization parameter value. To the contrary, Boice teaches that the second encoding subsystem encodes a sequence of frames a single time using a value which is determined by the information gathered by the first encoding subsystem (Boice: col. 2, lines 49-52; col. 7, line 51 – col. 8, line 4; col. 8, lines 36-44).

Therefore, since Wu fails to cure the deficiencies of Wang and Boice with respect to "pre-encoding the sequence of pictures for each of a plurality of quantization parameter values" as recited in claims 1, 13 and 14, the rejection of claims 1, 13 and 14 is believed to be improper and these claims are believed to be patentable and non-obvious over the cited references for at

least this reason.

Applicants would also like to address the Examiner's argument that Wang discloses *"selecting for each picture of the sequence one of the plurality of quantization parameter values responsive to the quantization parameter values and bitrate operating points of the neighboring pictures in a predetermined time window"* as recited in claims 1 and 14, and essentially recited in claim 13.

The Examiner first contends that the above elements are disclosed by Wang at col. 4, line 59 – col. 5, line 9 which recites:

Further in accordance with the present invention, motion video images which change from a slow changing scene to a rapidly scene are detected and quantization parameter Q is adjusted to more quickly adapted to the changing motion video signal and to continue to provide a particularly desirable compromise between image quality and available bandwidth. In particular, the absolute pixel difference between two consecutive frames is measured; the absolute pixel difference between the next two consecutive frames is measured; and the difference between the two consecutive absolute pixel differences is determined. If the magnitude of the difference between the differences is greater than a predetermined threshold, it is determined that the rate of change in the motion video signal is changing rapidly and quantization parameter Q is changed accordingly notwithstanding changes to quantization parameter Q as determined by the primary open loop rate control and secondary closed loop rate control

In view of the above passage, Wang discloses that the absolute pixel difference between frames is measured to determine whether the rate of change in a motion video signal is rapid, and that such information can be used to adjust quantization parameter Q. However, nothing in this passage, or any other passage in Wang, teaches or suggests that quantization parameters are selected which are "responsive to the quantization parameter values and bitrate operating points of the neighboring pictures". In fact, the above passage fails to mention that the quantization

parameter values and the bitrate operating points of neighboring pictures are taken into consideration in any manner whatsoever in the adjustment of the quantization parameter Q. Therefore, Applicant respectfully disagrees with the Examiner's argument that the above passage teaches or suggests the above-identified elements recited in claims 1, 13 and 14.

The Examiner further contends that the above elements in claims 1, 13 and 14 are alternatively disclosed by Wang at col. 4, lines 30-53, which recites:

Further in accordance with the present invention, a secondary close loop rate control ensures that overall available bandwidth is never exceeded. Quantization parameter Q is selected by accumulating a bandwidth buffer balance which represents the amount of available bandwidth which has not been consumed by encoded frames of a video image. The bandwidth buffer balance accumulates as time passes and is consumed by encoded frames which are transmitted through the communication medium whose bandwidth is measured. Encoding frames which are consistently slightly too large results in a persistent dwindling of the reserve available bandwidth as represented in the bandwidth buffer balance. In response to the reduction of the bandwidth buffer balance below a predetermined minimum threshold, quantization parameter Q is increased to reduce the size of subsequently encoded frames to consume less bandwidth at the expense of image quality. Encoding frames which are consistently slightly too small results in a persistent accumulation of reserve available bandwidth as represented in the bandwidth buffer balance. In response to the increase in the bandwidth buffer balance above a predetermined maximum threshold, quantization parameter Q is decreased to increase the size of subsequently encoded frames to improve image quality and to fully consume available bandwidth.

The cited passage explains that the quantization parameter Q may be adjusted by a bandwidth buffer balance which represents the amount of available bandwidth which has not been consumed by encoded frames of a video image. The Examiner attempts to broadly interpret the adjustment of the quantization parameter in accordance with the bandwidth buffer balance as constituting the selection of a quantization parameter value which is responsive to the "bitrate

operating points of the neighboring pictures”. Applicants respectfully assert that such a broad interpretation is improper, and that the above passage fails to disclose the above-identified elements in claims 1, 13 and 14 for at least this reason.

In addition, Applicants emphasize that while the above two passages of Wang (i.e., col. 4, line 59 – col. 5, line 9 and col. 4, lines 30-53) may provide for the adjustment of a quantization parameter (e.g., based on the “absolute pixel difference” or “bandwidth buffer balance”), neither of these passages, nor any other passage in Wang, teaches or suggests that the adjustment of the quantization parameter considers the “quantization parameter values” assigned to neighboring images in any manner whatsoever.

Therefore, for at least the reasons above, Applicants respectfully assert that Wang fails to teach or suggest “selecting means for selecting for each picture of the sequence one of the plurality of quantization parameter values responsive to the quantization parameter values and bitrate operating points of the neighboring pictures in a predetermined time window”. Moreover, since the other cited references fail to cure the deficiencies of Wang with respect to this element, claims 1, 13 and 14 are believed to patentable and non-obvious over the cited references for at least this reason.

Accordingly, claims 1, 13 and 14 are believed to be patentably distinct and non-obvious over for at least the preceding reasons directed to the Examiner's Answer as well as the following reasons reproduced from the Appeal Brief.

The previous arguments from the Appeal Brief will now be reproduced for completeness.

It is respectfully asserted that the rejection of Claims 1, 13 and 14 is improper because the modification of Wang with Boice would change the principle of operation of the invention in

Wang. Pursuant to MPEP § 2143.01(VI), “[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)”. A finding that the principle of operation of a prior art invention has been changed is appropriate when the “suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well as a change in the basic principle under which the [primary reference] construction was designed to operate” (see MPEP § 2143.01(VI), quoting *In re Ratti*, 270 F.2d 810, 813 (CCPA 1959)).

Wang discloses an encoding system using a single encoder with two loops to encode a video signal. A primary open loop is used to select a quantization parameter size (Wang: col. 4, lines 15-19; col. 9, lines 7-11), and a secondary closed loop is used to ensure that available bandwidth is never exceeded (Wang: col. 4, lines 30-32; col. 9, lines 11-28). On the other hand, Boice relates to an encoding system that utilizes two encoders to encode video frames in a real-time setting (Boice: Title; col. 2, lines 53-56; col. 7, lines 47-48). A first encoder generates statistical information about a sequence of video frames to be encoded (Boice: col. 2, lines 56-61; col. 8, lines 13-17). A control processor coupled to the first encoder uses the statistical information to produce a value for a parameter which is used to encode the sequence of frames (Boice: col. 2, lines 61-65; col. 12, lines 31-35), and sends the value to a second encoder which encodes the frames in accordance with the value (Boice: col. 3, lines 1-4; col. 12, lines 35-38).

In the present case, the Examiner contends that the first statistic gathering encoder in Boice discloses “pre-encoding the sequence of pictures for each of a plurality of quantization

parameter values". Thus, the Examiner attempts to modify Wang's encoding system with the first encoder of Boice. However, assuming, arguendo, that Examiner's interpretation of Boice is accurate, the modification of Wang with Boice in this manner is improper because it changes the principle of operation of the invention in Wang.

In order to modify the encoding system in Wang with the statistical gathering encoder of Boice, a substantial reconstruction and redesign of Wang's system would be necessary. For instance, an entirely new encoding subsystem would have to be added to the system in Wang which would allow Wang's system to gather statistics about a sequence of frames which is to be encoded. In addition, the control processor in Boice, which analyzes the statistical information generated by the first encoder and uses the statistical information to produce a value for an encoding parameter, would also have to be incorporated into Wang's encoding system. Even further, the basic principle under which Wang operates would have to be changed. Rather than utilizing the two-pass encoding scheme described in Wang, the encoding system in Wang would have to be reconfigured or reprogrammed to implement the single pass encoding scheme of Boice. Given all the changes that would be necessary to modify Wang with Boice, the combination of Wang with Boice results in a change in the principle of operation of the encoder in Wang. Accordingly, the present rejection is believed improper for at least this reason.

However, even if it is somehow determined that combination of Wang and Boice is proper, the rejection of Claims 1, 13 and 14 would still be improper because the cited references fail to teach or suggest *"selecting for each picture of the sequence one of the plurality of quantization parameter values responsive to the quantization parameter values and bitrate operating points of the neighboring pictures in a predetermined time window"* as recited in

Claims 1 and 14, and as essentially recited in Claim 13.

In the Examiner's rejection of Claims 1, 13 and 14, Wang is relied on as disclosing the above-identified element. More specifically, the Examiner relies on a single passage in Wang which states:

In accordance with the present invention, a primary open loop rate control selects an optimized quantization parameter Q by determining a desired size for an individual frame...
(Wang: col. 4, lines 14-16).

As evidenced by the above passage, Wang does teach that a quantization parameter is selected for encoding a frame. However, neither the cited passage, nor any other passage in Wang, discloses that the selection of the quantization parameter is "responsive to... the neighboring pictures in a predetermined time window" as set forth in the present claims. In fact, the selection of the quantization parameter in Wang does not in any way involve a consideration of the neighboring pictures. Rather, as explained in this reference, the value of the quantization parameter is selected by comparing the size of a single encoded frame with a target frame size, and subsequently increasing or decreasing the quantization parameter depending upon the result produced by the comparison (i.e., depending upon whether the comparison reveals that the encoded frame size is greater or less than the target frame size) (Wang: col. 4, lines 15-26; col. 9, lines 7-11). Moreover, since Wang does not refer to the neighboring pictures when selecting a quantization parameter, it logically follows that Wang further fails to teach that the selection of the quantization parameters is responsive to the "quantization parameter values" and "bit rate operating points" of the neighboring pictures. Accordingly, for at least these reasons, Wang cannot be interpreted as teaching or suggesting *"selecting for each picture of the sequence one of*

the plurality of quantization parameter values responsive to the quantization parameter values and bitrate operating points of the neighboring pictures in a predetermined time window” as recited in Claims 1 and 14, and as essentially recited in Claim 13.

It should be noted that neither of the other cited reference teach or suggest this element either. In general, Boice teaches that the dual encoder system described therein can generate values for parameters, including a quantization parameter, by generating and analyzing statistics about a sequence of frames before they are encoded. However, this reference fails to disclose that quantization parameter values are selected which are responsive to the quantization parameter values and bitrate operating points of the neighboring pictures in a predetermined time window. Likewise, Wu fails to disclose the same. It appears that this reference was cited for the limited purpose of disclosing a “predetermined time window”. Thus, this reference discloses little if any anything regarding the selection of quantization parameters. Accordingly, the present rejection is believed improper since all of the cited reference fail to teach or suggest the above-identified element of Claims 1, 13 and 14.

In addition to the above discussion, the present rejection is also believed to be improper because the cited references, whether taken singly or in combination, fail to teach or suggest *“pre-encoding the sequence of pictures for each of a plurality of quantization parameter values”* as recited in Claims 1, 13 and 14.

In rejecting Claims 1, 13 and 14, the Examiner concedes that Wang fails to disclose the above-identified element, but asserts that such is disclosed by Boice. More specifically, the Examiner relies on the following passages in Boice as teaching the above-identified element:

Subsystem E1 is configured to derive statistics on one or more

characteristics of a sequence of frames to be encoded. These characteristics are statistically analyzed by controlling processor 520 to dynamically develop a value for one or more controllable parameters to be used by subsystem E2 in encoding a current frame of the sequence of frames, thereby optimizing picture quality and/or encoding performance.
(Boice: col. 4, lines 26-35)

The statistical measures can describe different characteristics of an image frame, for example, busyness of a frame, motion between image frames, scene change or fading, etc. Using the calculated statistics, adaptive encoding of the video sequence is then carried out by controlling one or more encoding parameters of the real-time encoding process. For example, bit allocation, quantization parameter(s), encoding mode, etc., can be changed from frame to frame or macroblock to macroblock within a given frame according to derived statistics of a characteristic (e.g., scene content) of the particular frame(s).
(Boice: col. 7, lines 30-39)

E1 is programmed to generate the desired statistics, such as interframe/intraframe non-motion, motion, etc. statistics, which are important to the encoding subsystem's (E2) specific bit rate control algorithm. E2 generates encoded frames based on the statistics generated by encoding subsystem E1.
(Boice: col. 7, lines 50 – col. 8, line 5)

In accordance with the above passages, Boice teaches that a first encoding subsystem (i.e., E1) can be used to generate statistical information (e.g., statistics relating to the “busyness of a frame, motion between image frames, [and] scene change or fading”) regarding a sequence of frames. It is further explained that this statistical information can be used by a second encoding subsystem (i.e., E2) to encode a video sequence. However, the cited passages reproduced above, along with the other passages in Boice, fail to explicitly recite that this dual encoder system involves pre-encoding a sequence of pictures, and further that such pre-encoding is done “for each of a plurality of quantization parameter values.” Furthermore, any argument

that the statistical gathering performed by the first encoding system would suggest pre-encoding a sequence of pictures for each of a plurality of quantization parameter values would constitute an improperly broad interpretation of Boice. When given its broadest interpretation, Boice teaches that statistical information regarding a sequence of pictures can be gathered in order to alter a parameter (e.g., a quantization parameter) which is used to encode the sequence of pictures. However, even when Boice is given its broadest interpretation, this reference fails to teach or suggest “*pre-encoding the sequence of pictures for each of a plurality of quantization parameter values*” as recited in Claims 1, 13 and 14.

The other cited reference, Wu, fails to cure the deficiencies of Wang and Boice with respect to disclosing the above-identified element. As mentioned briefly above, it appears that Wu was only cited for the limited purpose of disclosing a “predetermined time window”. However, regardless of whether Wu actually discloses a “predetermined time window” as the Examiner contends, the rejection of Claims 1, 13 and 14 is improper since Wu, like the other cited references, fails to teach or suggest anything about pre-encoding a sequence of pictures for each of a plurality of quantization parameter values.

Therefore, for at least the reasons set forth above, Claims 1, 13 and 14 are believed to be patentably distinct and non-obvious over the combination of Wang, Boice and Wu.

Moreover, “[i]f an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious” (MPEP §2143.03, citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)). All remaining claims depend from either Claim 1 or Claim 14, or a claim which itself is dependent from one of these claims. Accordingly, all remaining claims

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are patentably distinct over the cited references for at least the reasons set forth above. Thus, reconsideration of this rejection is respectfully requested.

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C. Conclusion

At least the above-identified limitations of the pending claims are not disclosed or suggested by the teachings of the cited references. Accordingly, it is respectfully requested that the Board reverse the rejections of Claims 1, and 3-22 under 35 U.S.C. § 103(a).

In the event of any non-payment or improper payment of a required fee, the Commissioner is authorized to charge **Deposit Account No. 07-0832** as required to correct the error.

Respectfully submitted,

Dated: _____

July 6, 2010

By: _____



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